

To Perform a Fatigue Analysis...

At present Fatigue Analysis is restricted to the ASME B31.x Piping Codes covered by **TRIFLEX[®] Windows**, B31.1, B31.3, B31.4, B31.5, and B31.8.

For this example we will use an existing piping system, Tutorial01.DTA located in the Demo Samples Folder in the installation directory (by default, C:\Program Files\TRIFLEXWindows\Demo Samples):

- 1) Go to Main Menu/Setup/Case Definition and select the check box “Perform Code Compliance Analysis” for the case for which you wish to analyze fatigue.
- 2) For each component, on the Code Compliance Tab, and look for the Fatigue Curve Drop List. A default Fatigue Curve has been assigned by the program, if the material fits into one of several categories. You may accept the default, select another entry in the list, or define your own curve using the Fatigue definition dialog.
- 3) Go to Main Menu/Setup/Modeling Defaults and check the Perform Fatigue Analysis box.
- 4) Go to Main Menu/Setup/Cyclic loading and enter expected number of cycles to be encountered by the system at the defined loading.
- 5) Calculate using the Green Calculate Arrow or Main Menu/Calculate/Base Calculation.
- 6) Go to Main Menu/Output/Piping Code Compliance. Move the bottom slide bar to the right such that the last four columns are visible. These are:
 - A) Alternating Stress, or roughly speaking the amplitude of the stress which is cycling
 - B) Maximum Allowable Cycles, as defined by a particular Fatigue Curve and the Alternating Stress amplitude,
 - C) Usage Factor (this case), which is your input value of expected cycles for this case divided by the Maximum Allowable Cycles, and
 - D) Cumulative Usage Factor, which is the sum of Usage Factors for all cases examined.
- 7) Should the Cumulative Usage Factor or the Usage Factor for a particular case exceed 1.0, then a problem may exist with that particular component due to fatigue loading. The Code Compliance Report will identify such components by highlighting the offending entry.